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The speaker discusses two methods of teaching. He describes the data transmission system with its use of technology (computer assistance, audio-tutoring, etc.) as merely an updating of the traditional attempt by the teacher to impart a body of subject matter and by the student to absorb and store it for future retrieval. Opposed to this transmission and storage of data is the method of acquisition and assimilation of information. The three main differences are: (1) source of initiative in the educational process, (2) primary criterion for the organization of data, and (3) predominant behavioral outcome. In the traditional system, the teacher takes the initiative, the main criterion is relating bits of information to other bits, and the resulting behavior is mainly manipulative. In the acquisition method, the student does the initiating, the main criterion is the accumulated experience and present understanding of the learner, and the dominant resulting behavior is associative. The speaker feels both models are valid and should be used, but that machines do a better job of transmitting data than a teacher can, while the teacher who performs as a motivator, counselor, consultant will never become obsolete. In summary, the student in a traditional system is a manipulator, adapting all things to himself; in the acquisition system, he more likely relates all things with himself--the distinction being between adapting to and relating with. The speaker illustrates his point from his own teaching experience. (HH)

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GETTING WITH INSTRUCTIONAL SYSTEMS AND GETTING INSTRUCTIONAL SYSTEMS WITH IT*

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There are at present two trends in American education which claim to be innovative. One of these trends relies very heavily on educational technology--computer assisted instruction, dial access systems, audio-tutorial systems, and other self-instructional equipment and material. This trend may best be seen as an effort to more efficiently transmit an ever-increasing body of data to an ever-increasing number of students. Although this trend legitimately claims the title of being innovative, it is nevertheless little more than an attempt to more effectively rationalize the traditional form of education whose primary concern is the mastery of a body of content. The dominant elements of the educational process, including faculty, students, information, and examinations, are carefully programmed to achieve maximum student attainment of predetermined, mostly symbol-manipulative objectives. Education via instructional systems tends toward the dispensation of prescribed and pre-ordered information. Learning via instructional systems tends toward the mental storage for later retrieval of the same type of information.

The other innovative trend in American education is much more radical in that it attempts to devise an entirely new form for the educational process rather than merely rationalize the existing trend via technology. Whereas traditional education in America has emphasized the transmission and storage of information, the other form emphasizes the acquisition and assimilation of information. The differences between the transmission model of education and the acquisition model of education lie in three areas:

1) in their location of the source of initiative in the educational process;
2) in their assumptions about the primary criterion for the organization of data;
3) in their predominant behavioral outcomes.

In the transmission model the initiative lies with the teacher (person, book, machine, or some combination of the three) who presents pre-packaged information in a form which the student is expected to replicate. In this model the learner is viewed essentially as a recipient of education. His principal obligation is to preserve the pre-packaged information relatively intact, so it can be reproduced in its original form in response to the appropriate cue. The emphasis on maintaining the information pattern as transmitted derives from the assumption that the primary criterion of relevance for a given bit of information is its relationship to other bits of information. The dominant behavior conditioned by this model of education is manipulative---manipulative not only of information but, by extension, of everything in the environment to which information refers including people. Our educational model is essentially a model of reality and how one deals with it. An educational model that concerns itself primarily with the manipulation of data conditions people to manipulate the "reality" to which the data refers as well.

In the acquisition model of education the initiative lies primarily with the learner, who seeks information which will help him to make more sense out of himself and his various situations. In this model, the learner is viewed

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essentially as the incipient of his education. His strategy is to discover and utilize that information which can be most meaningfully related to his own particular needs to know, to do, and to be. This strategy assumes that the primary criterion for the organization of data is the accumulated experience and present understanding of the learner at the moment of encounter with the information. The dominant behavior conditioned by this model of education is associative, and again is generalized beyond data and information to the human and material environment codified thereby.[1]

I think that the wave of the future lies neither with the institution which innovates along the lines of making the transmission model of education more efficient, nor does it lie with those institutions which specialize in developing the acquisition model (or the "dialogue" model, "process" model, "learner-centered" model, whatever you want to call it). It lies, rather, with those institutions which do both of these things. I make this assessment not only because I believe that both models have validity, but because our present technology makes the adoption of both models imperative. That learning which is most effectively accomplished by rote processes can today be achieved much more efficiently by a machine than by a human person. The present-day teacher who performs as a transmitter of data is obsolescent because he will, sooner or later, be replaced by a machine. On the other hand, the teacher who performs as a motivator, a facilitator, a counselor, a resource, a guide, a consultant, need never concern himself about obsolescence vis-a-vis technology. A teaching machine can replace only an inferior teaching machine. A teaching machine will never replace a person who is doing that which human beings are uniquely capable of doing. Until recently it may have been intelligent to assume that human beings were adequate data transmitters. The computer, the tape recorder, the dial access system--all such technologies make this assumption untenable. As transmitters of data we can and will be replaced.

Technology is not only providing the machinery for more effective transmission of data, it has also given us a technique for making our strategy of transmission much more effective, the technique already cited as instructional systems.[2]

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1. Associative behavior is difficult to define primarily, I suppose, because most of the institutions in our society condition manipulative behavior rather than associative behavior. The manipulator is preoccupied with adapting all things to himself. The associator is more concerned with relating all things with himself. The distinction is the difference between adapting to and relating with.
2. Systematic instruction is not new historically. One of our greatest models of the systematic instructor is Socrates. Socrates knew exactly what he wanted his students to think and he programmed his questions in such a way as to assure that they would be thinking that way at the conclusion of the dialogue. One of the things which has separated Socrates from many if not most teachers since was his keen awareness of what he was doing. Perhaps the greatest shortcoming of teachers is their unawareness of what they are doing and their correlative inability to know 1) whether what they are doing is what they want to be doing and 2) whether whatever they are doing is being done as effectively as they assume it is.

   The instructional systems approach provides the teacher with a technique designed to overcome this shortcoming and to confer upon him the ninth beatitude so frequently cited by Roger Garrison: "Blessed art they who know what they are doing, for they shall know when they have done it." There is a definite advantage to knowing very specifically what it is you are trying to do and how you are doing it, because then you can know whether or not and how well you have done it.

Instructional systems became inevitable when we set about programming instruction, because in order to program it we had to become extremely specific. We had to be very precise in our knowledge of the capabilities of the students coming into our course so we would know where to begin the program. We had to be very precise in defining the abilities that we wanted the student to have at the end of the course so we would know what to put in the program to get him there. And we had to be very precise about sequencing the information in the program, in order to get the student from where he was to where we wanted him to be. In other words, when we began to program instruction we had to face up to the old truth that "you can't get there from here."

Everybody knows that you can't get there from here. Wouldn't it be nice if everybody taught that way? Most of us teach on the basis of unfounded assumptions about the preparation and abilities of our students to receive, digest, and make meaningful the information we want to give them. At best we usually start somewhere in between their present understanding and ours--we don't start with their "here" and come to our "there", we start somewhere in between. At worst, of course, we just begin where we are at and never relate to the students. The first ambiguous tendency which the systems approach corrects is that which leads us to pitch the ball in such a way that it ends up out in left field having never approached the batter.

A second ambiguous tendency which is corrected by the systems approach is that which characterizes our course objectives. The systems approach to instruction makes the teacher aware of what he is doing, primarily by focusing on the purpose and the result of his instruction, behavioral change. Educators tend to be very resistant of the charge that they are in the business of changing behavior. Yet I have never met a teacher who would declare that he intended his students to be in no way different at the end of his instruction than they were before they began. And if, in fact, we expect that students are going to be somehow different at the conclusion of our period of instruction, then we are assuming that there is going to be a change in their behavior. Some aspect of their behavior obviously is expected to change or there isn't going to be a difference.

Instruction begins to be systematic when, upon the recognition of his attempt to change behavior, the instructor asks "what behavior do I want to change?" In the jargon of instructional systems this question becomes "what terminal behaviors should I be able to detect in my students at the conclusion of my instruction that they do not exhibit at the beginning?" The specification of terminal student behaviors to be detected at the conclusion of a period of instruction is a dramatic antidote for fuzzy thinking.

Take, for instance, the teacher who says, "I prepare students for life." This is a very noble educational objective. But the problem with education being a preparation for life is that it is inevitably too late. I am sure that our students would be very well prepared for life if they didn't begin it until after they had received our instruction. The problem is that they come to us before they have had the benefit of our instruction--already broken in as it were. And if we are seriously going to maintain that our basic purpose is to prepare them for life, then we are essentially saying that our basic purpose is either to remedy the fact that they were born or to impose upon them a life not of their own making. When one applies the systems test of "how do you achieve this objective and how do you measure its attainment?" many traditional statements of purpose are shown in all their meaningless ambiguity: "I teach students to appreciate the subject matter of my course," " I am teaching my students to be better citizens," etc. Most statements which appear in the opening pages

of college catalogues likewise fail to pass this test.

The clarity with which one views both his objectives and the methods for their attainment in the instructional systems approach is, I believe, a conclusive argument for getting with the systems approach. But it is also a conclusive argument for getting beyond instructional systems, as presently limited. My personal teaching experience becomes relevant at this point.

I did not discover the instructional systems approach via the literature on the subject, I stumbled on it via self-examination of my own teaching experience. At the end of my first semester of teaching I sat down to make a final examination and discovered that I couldn't do it without consulting the text-book and the lecture notes. I found myself asking, "If I can't prepare an examination without referring to the textbook and the lecture notes, how can I expect my students to take an examination without reference to the same materials?" It was when I found myself unable to make an examination which I expected my students to take that I asked myself just what, specifically, were my objectives in the course? Just what type of behavioral change was I working for, what did I really want my students to do at the end of the course that they couldn't do at the beginning of the course? And when I asked myself what effect I was having on student behavior, the only thing I could come up with was that I was making them more effective manipulators of the data of U.S. history. And when I asked the next logical question, "Why am I making them more effective manipulators of the data of U.S. history?" I was aghast at what I finally had to accept as the honest answer, "So that they could pass my final examination."

Making students more effective manipulators of information to the end that they become more effective manipulators of information was never my <u>professed</u> role as an educator. But at one time this was my actual, though not admitted (because not conscious) objective. I began my teaching career primarily as a preparer of students to take my exams. This system was totally self-validating and self-justifying. But it wasn't very self-satisfying, either for the students or for myself. The only thing which appalled me more than that particular revelation was my later discovery that instructional systems often seem to have fallen into the same trap, and have made a virtue of this trap.

The trap is an easy one to fall into. The only aspects of human behavior we can measure with objective accuracy are those which involve the replication of a skill or the duplication of a body of information. Beyond this we are in the subjective, or what psychologists call "affective" domain. We know how to measure quite accurately the ability to manipulate data, but we haven't even begun to know how to measure the assimilation of it, the incorporation of it into a style, way, or philosophy of life and being. Those of us whose interest is to teach people rather than subject matter have few objective procedures for the evaluation of whether and how well we have done so. Objective measurements are mostly designed to measure only replicated subject matter. The principal reason for our almost exclusive preoccupation with the manipulation of data is our ability to measure with accuracy only the manipulation of data. The medium is the message.

The problem is that while the medium may be the message, the medium does not necessarily validate the message. Our examinations do not validate the course objectives. The fact that we can objectively measure only certain things does not validate an exclusive interest in those things which we can measure. I cannot buy the arguments of those who make a virtue of rigid adherence only

to the objectively measurable. To say that we have no business teaching self-confidence because we have no way of conclusively measuring whether and how much our students have attained it--this argument is as self-defeating as its basic assumption is self-justifying. We will never learn to do anything until we set about to do it. We will never learn to measure the attainment of self-confidence until we set out to teach the attainment of self-confidence.

It was only a year ago that I took sufficient courage to deliberately adopt a set of subjective goals for my instruction. I decided last fall that my students should develop four behaviors as a result of my course:

1) increased ability to perceive interrelationships across disciplinary boundaries,
2) increased ability to establish human relationships,
3) increased autonomy (self-reliance, independence, individuality, etc.), and
4) increased self-affirmation (self-esteem, sense of self-worth, etc.).

Assuming that the ability to perceive relationships across boundaries would be facilitated by my refusal to establish any boundaries, and assuming that the ability to develop autonomy would be facilitated by an atmosphere of freedom, I turned my class over to my students--totally and completely. I announced that I would assign no reading, require no papers, and give no examinations. If the students wanted to read, they would choose their reading assignments. If they wanted to write, they would write as the spirit moved them. If they wanted to be examined, they would have to devise their own examinations. Furthermore, they would decide what to do with the class sessions. And at the end of the semester, they turned in their own grades. The only criterion the student would have for grading himself would be his self-evaluation of how well he utilized this opportunity to learn free, somehow converting his conclusions into an "A", "B", "C", "D", or "F".[3]

The most significant pedagogical insight derived from this experiment was my totally new perspective on the evaluation process. I overcame the objectivity bind, which might be defined as the compulsion to attempt greater and greater degrees of objectivity as one becomes more and more aware of the subjectivity inherent in any objective system of measurement. I overcame this bind merely by the discovery of a means of assessing subjective behavior. This discovery was the result of my doing two things that most teachers probably would never think of doing: I prepared a purely subjective examination, and then I took my students' answers at their word.

The examination consisted of 14 questions:

1) What has this experience done for me?
2) What have I done for this experience?
3) How am I different as a result of this experience? Why?
4) What have I learned from this experience? Both generally and specifically? What contributed to this learning?
5) What questions have I become aware of as a result of this experience? Why?

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3. The students had all sorts of trouble with this grading system. One of them said, "But you see, there are no valid objective criteria for establishing a grade." To which I responded, "Beautiful! Now you understand my problem."

6) What conclusions have I drawn as a result of this experience? Why?
7) Have I developed new interests as a result of this experience? How? Why?
8) Have attitudes toward others and myself been affected by this experience? How? Why?
9) To the best of your knowledge, have the interests and attitudes of others in the group been affected by this experience? How? Why? Please use specific examples.
10) Has this experience affected my other coursework? How? Why?
11) Has this experience affected my relations with others outside the group? How? Why?
12) Has this experience affected my manner of living? How? Why?
13) What has prevented this experience from being more effective for myself and for others?
14) How would I improve this experience?

The purpose of asking so many similar questions was to elicit a greater depth of response from the students. [4]

The two major criteria which determine the accuracy of a reactive behavioral measurement (one in which we are getting a response from the person being measured) are the honesty of the person being measured and the validity of the examination itself (i.e., does it measure what it sets out to measure?). Since the only "right" answers on a truly subjective examination are the honest answers of the person who is taking it, it is quite unlikely that one can cheat on such an examination without being detected by someone who already knows him. And since I had communicated to no one, including my colleagues, what my objectives in the course were, there really was no way that any of my students could tell me what I wanted to hear. Honesty of response on my exam was therefore essentially assured. The examination validated itself, not because of any quantitative assessment but by virtue of a pattern of behavior reported in most of the responses. The students consistently reported certain types of reaction to the course which indicated that to some degree (and the degree, of course, is unmeasurable) they had attained some or all of the objectives of the course. As it turned out, I even had a control group in this experiment. The only examinations on which the prevailing patterns failed to show up at all were those of students who had already demonstrated a pattern of self-deception. Students who told me what they thought I wanted to hear produced the traditional "snow job". They did not, in fact, tell me what I was looking for. Those who weren't trying to did. I took this to be additional confirmation of the validity of a test designed to assess the attainment of integral behaviors. It was the student without integrity who failed.

Of course it can be argued that qualitative measurements can never approach the accuracy of quantitative measurements. For instance, I am unable (probably forever) to assess the percentage of increase in self-esteem and autonomy on the part of either a total group of students or on the part of individual members of the group severally. But I think it is rather meaningless to try to reduce qualities to quantities. Those who can trust only quantitative instruments can stick to teaching only the ability to manipulate data. I prefer to enable my students to develop not only the ability to manipulate data, but the ability to self-actualize, to realize their human potential. Objectivists who are concerned with what they can quantitatively measure can count numbers. I will try to devise techniques for perceiving patterns. Objectivists may continue to specialize in rendering unto objectivity that which is objectivity's. Others, I hope, will begin or continue to generalize,

4. Representative answers are included in a published report of the entire experiment, entitled Dialogue on Dialogue (Indianapolis, Bobbs-Merrill, Inc., 1968)

and render unto both objectivity and subjectivity that which is respectively appropriate. If they do so, I am convinced we can devise academically legitimate instruments for self-evaluation. I shall perhaps be accused of unsubstantiated faith, and if so accused I will plead guilty to the charge. My faith is as unsubstantiated as the faith of one who makes the subjective decision that item "four" on his final examination is worth as many points as items "one" through "three". The objectivist and the subjectivist are in the same boat; they are merely pulling opposing oars. And as I already suggested, the wave of the future may swamp those educators and those institutions which don't learn how to pull both oars.